REMARKS/ARGUMENTS

Claims 1-26 were pending in this application. Claims 1, 4, 8, 13, 16, 20, and 26 have been amended, claims 27-32 have been added, and claims 7, 10, 12, 19, 21, and 25 have been canceled. Hence claims 1-6, 8, 9, 11, 13-18, 20, 22-24, and 26-32 are now pending. Reconsideration of the subject application as amended is respectfully requested.

Claim 16 has been objected to because of a typographical error in line 6 that recites "applying a BARC over said polysilicon layer". Line 6 should read --applying a BARC over said nitride layer--.

Claims 1-10, 12-21, 25, and 26 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U. S. Patent No. 5,886,391 to Niroomand et al.

Claims 1, 4, and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant admitted Prior Art in view of U. S. Patent No. 5,956,584 to Wu et al.

Claims 1, 4, and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant admitted Prior Art in view Niroomand.

Claims 11 and 22-24 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Niroomand in view of U. S. Patent No. 5,949,126 to Dawson et al.

FORMAL MATTERS

Claim 16 has been corrected as requested by the Examiner by changing "polysilicon layer" to --nitride layer--.

CLAIM REJECTIONS UNDER 35 U.S.C. §§ 102 AND 103

Independent claim 1 provides a method of forming a trench isolation structure on a substrate. The method includes, *inter alia*, applying a pad oxide layer, a polysilicon layer, and an ARC. A trench is formed by etching, and the photoresist is removed. The method includes overfilling the trench with a trench fill material, with the trench fill material having a porous region located generally adjacent the ARC. A portion of the trench fill material is removed,

including removing the porous region. In this manner, porous regions are first formed adjacent the ARC layer, and subsequently removed when a portion of the trench fill material is removed. Such a feature is neither disclosed, taught, nor suggested by the cited art.

More specifically, Niroomand generally discusses forming anti-reflective structures that, in one embodiment, includes a silicon nitride layer formed over a polysilicon layer disposed on a substrate surface. A dielectric material 36 is deposited in an isolation trench and subsequently etched. Tellingly, Niroomand fails to mention, discuss, or teach any problems with the porosity of the dielectric layer. More specifically, Niroomand fails to recognize the problems which Applicants' present invention solves. Niroomand clearly fails to disclose, teach, or suggest forming dielectric material having a porous region, and then removing the porous region from the trench fill material, as required by claim 1. Niroomand uses the polysilicon layer as part of an anti-reflective structure, and makes no reference to the use of polysilicon to help locate a porous region in a desirable location so it may be removed to produce exemplary trench fill. Hence, Niroomand fails to disclose, teach, or suggest the invention as provided in amended independent claim 1.

Independent claim 1 is further allowable over Applicants' own description of the problem in view of Wu and/or Niroomand. Wu appears to disclose depositing an oxide layer, a polysilicon layer, and then a silicon nitride layer. Wu does so, however, while forming a gate electrode not an isolation structure. The teachings of Wu have no bearing on the formation of isolation trenches, let alone on the specific problems addressed by Applicants' invention with respect to the porosity of dielectric layers formed to fill the isolation trenches. Wu and Niroomand both fail to even recognize the porosity problem, and hence their teachings cannot be used separately or in combination to solve the present problems without impermissible hindsight by the Examiner. Thus, for at least these reasons, independent claim 1 is allowable over the cited art including Niroomand, Wu, and any description of the problem posed by the Applicants.

Dependent claims 2, 3, and added dependent claims 27-32 are allowable for at least depending from an allowable independent claim 1. Further, these dependent claims are allowable for the additional novel features contained therein. For example, added dependent claim 31 provides that subjecting the substrate to an oxygen-containing gas and heating the

substrate to densify a dielectric layer forms an increased dielectric layer thickness at the polysilicon layer adjacent a trench corner. This feature is clearly not disclosed, taught, nor suggested by the cited art, and claim 31 is allowable for at least this additional reason.

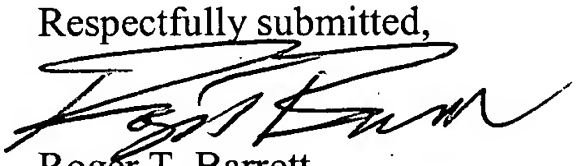
Similar amendments have been made to independent claims 4 and 16, and each of these claims is allowable for at least the reasons described in conjunction with claim 1. More specifically, the cited art Niroomand, Wu, Dawson, and any discussion of the problem in the present application, does not disclose, teach, or suggest the methods as claimed in independent claims 4 and 16. More specifically, the cited patents fail to identify the porosity problem, and hence there is no motivation or teaching to use the processes in the cited patents to solve an unrecognized problem without undue hindsight. Thus, independent claims 4 and 16 are allowable over the cited art. Claims 5, 6, 8, 9, 11, and 13-15 are allowable for at least depending from an allowable independent claim 4. Claims 17, 18, 20, 22-24, and 26 are allowable for at least depending from an allowable independent claim 16.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,



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Attachments
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Amendments to the Drawings:

The attached two sheets of drawings include a change (designation as --Prior Art--) to Fig. 1 as requested by the Examiner. These sheets, which include Figs. 1A-1H, replace the original sheets including Figs. 1A-1H.

Attachment: Replacement Sheets 1 and 2